

Cape Lookout Shoals Buoy Overview

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Coastal Ocean Observing System Background

In May of 2000, the Chief of Naval Research, the Administrator of NOAA, and the President of the Consortium for Ocean Research and Education announced the formation of OCEAN.US, an organization dedicated to the formation of an Integrated and sustainable Ocean Observation System (IOOS). The vision for IOOS is that observing systems scattered across the country cooperate to “collect and disseminate data and data products to serve the critical and expanding needs of environmental protection, public health, industry, education, research, and recreation” (from the September 30, 2003, draft of the IOOS Executive Summary). Identified needs for IOOS data include:

- Marine operations (e.g. shipping, offshore operations like drilling and mining)
- Natural hazard mitigation (e.g. storm forecasting, surge prediction, tsunami warning)
- Climate change and its effects (e.g. inter-annual variability in water temperature, salinity, nutrients, storminess, plankton species and abundance, fish species and abundance)
- National security (e.g. toxin trajectories, detection of covert operations)
- Public health (e.g. unsafe biological activity, rip currents, harmful algal blooms)
- Assessing ecosystem health (e.g. changes in food web structure)
- Sustained use of marine resources (e.g. fish stock assessments)

The South East Atlantic Coastal Ocean Observing System (SEACOOS) is a two-year old regional partnership that comprises one component of the national IOOS system. SEACOOS has initiated creation of an integrated coastal ocean observing system for a four-state region of the southeastern coastal U.S. consisting of North Carolina, South Carolina, Georgia and Florida. As part of this program, SEACOOS is establishing and will maintain real-time reporting ocean/atmosphere measurement platforms throughout this region. SEACOOS has been funded by Congressional allocations to the Office of Naval Research. Considerable further details about SEACOOS and its products can be found at www.seacoos.org.

The SEACOOS effort in most of North Carolina is proceeding under the guidance of the NCCOOS group. To date this group has deployed an HF radar system at Cape Hatteras to map surface currents and is prepared to deploy a sophisticated meteorological/oceanographic research buoy off the tip of the Cape Lookout Shoals in the summer of 2004. Data from these systems will be available to the public via a variety of distribution mechanisms including the SEACOOS web site and the National Data Buoy Center Dial-A-Buoy telephone system.

Buoy Information

NCCOOS has purchased two new research buoys from the Gulf of Maine Ocean Observing System (GOMOOS, www.gomoos.org) group. For the past several years the GOMOOS group has successfully maintained more than 10 of these buoys in the waters of the Gulf of Maine. The buoys were delivered to the UNC Institute of Marine Sciences in Morehead City on 23 June 2004 and are presently being outfitted with the following instrumentation and communications packages:

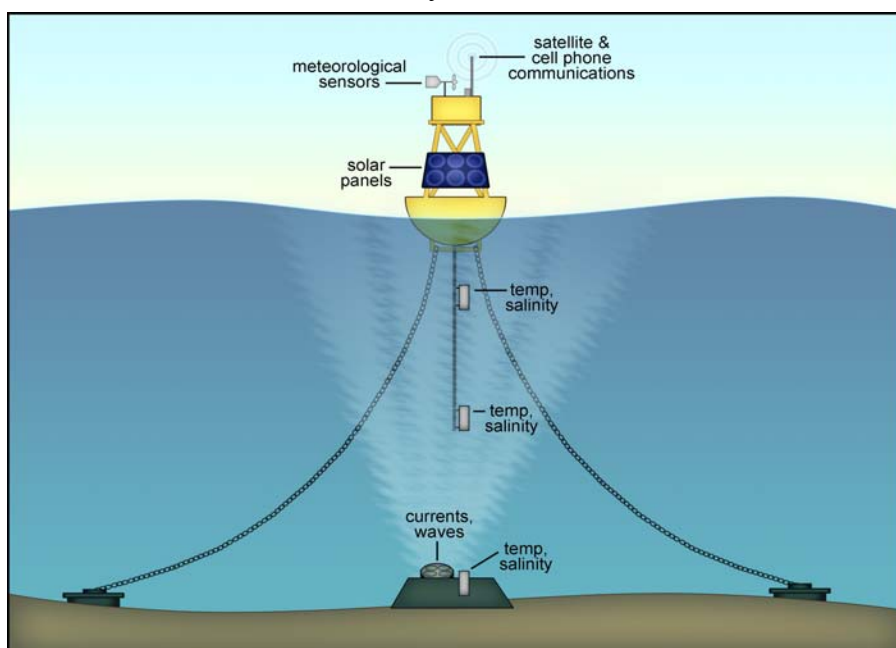
- Iridium satellite and cell phone communications,
- meteorological sensors including wind speed and direction, air temperature and humidity, long wave and short wave solar radiation, barometric pressure and precipitation,
- water temperature and salinity near the surface, mid-depth and bottom of the water column,
- water speed and direction throughout the water column,
- wave height, period and direction,
- an Argos, satellite-based tracking system,
- batteries and solar charging system, and
- 5 nm LED light, radar reflector.



Buoy arrival and unloading at the Institute of Marine Sciences, 23 June 2004.

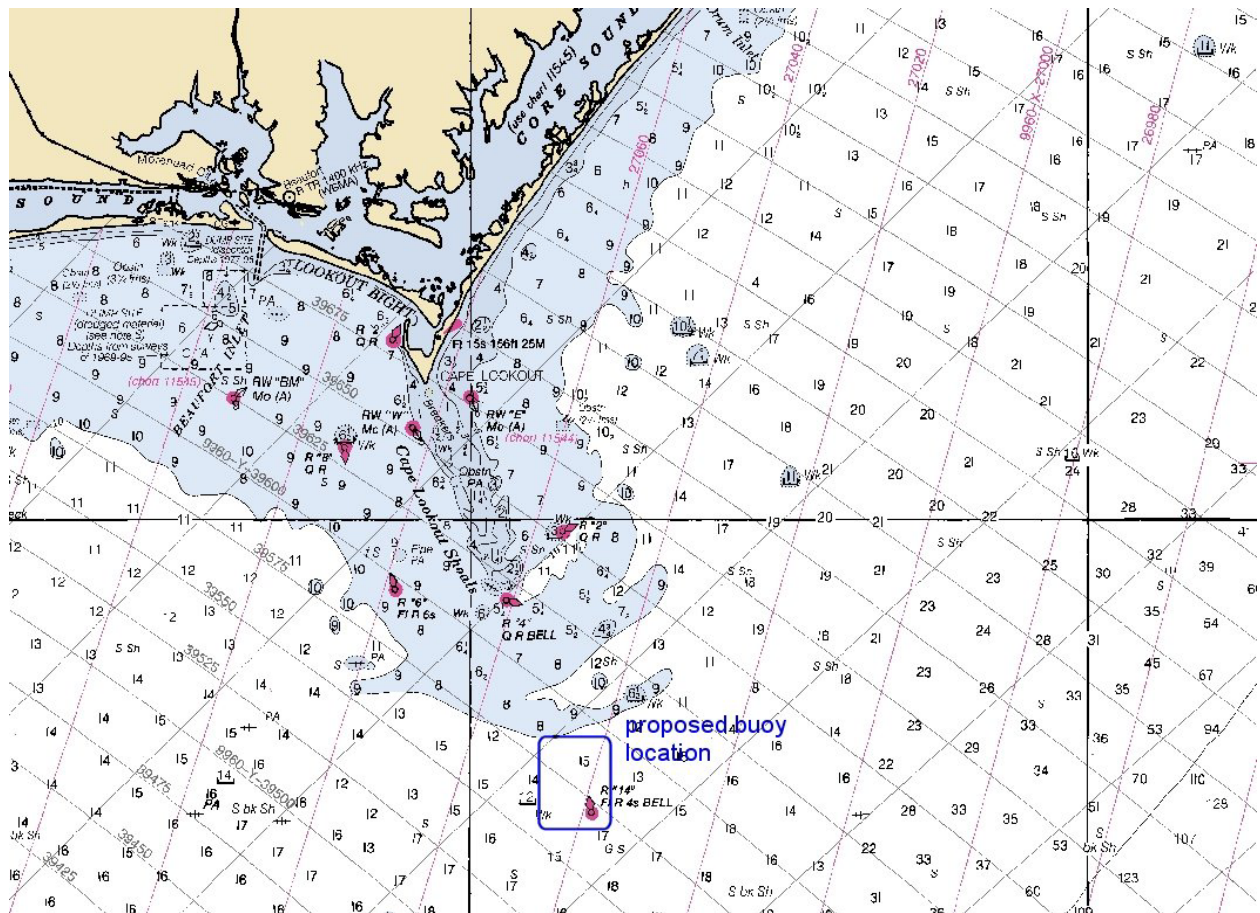
Some of these instruments will hang in the water column below the buoy and some will be mounted on a frame deployed on the bottom beneath the buoy. The bottom mounted sensors will communicate with the buoy via acoustic telemetry through the water column. When completed, the buoy will relay data from all of the sensors to shore every hour and this data will be checked for quality control and posted for public access shortly thereafter.

The buoy will be secured using a two point mooring with each leg anchored by a stack of three diesel locomotive wheels (weight of each stack in air 2500 – 3000 lbs). This mooring will help limit the buoy travel circle and therefore keep it within the acoustic telemetry cone of the bottom sensors.



Buoy deployment schematic

It is proposed that the buoy be deployed in 80 - 100 ft of water 15 - 18.5 nautical miles SSE of the tip of Cape Lookout in the vicinity of the “14 buoy”, which is a US Coast Guard maintained navigational aid at approximately longitude 76° 24' W and latitude 34° 18' N. This location will provide information on off shore meteorological and wave conditions, on exchange between Raleigh and Onslow Bays around the end of the Cape Lookout Shoals and on interactions between shelf waters and the Gulf Stream. The final buoy location is pending approval of the US Coast Guard.



Proposed buoy location